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Locate the Internal Organs in the Human Body: A survey in Turkey

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Abstract

The aim of the study was to determine to what extent fifth grade students located the internal organs on the outline of human body. Study group consisted of 150 students at two primary schools in Balıkesir in northwest of Turkey during the fall term of 2011-2012 academic years. Data were collected by Locate Internal Organs Questionnaire consisting of two open-ended questions. In the first question (written question), the names with numbers of the internal organs in the human body were given to the students and the students were asked to locate the numbers of the internal organs on the outline of the human body. In the second question (written-visual question), the names and images with numbers of the internal organs in the human body were given to the students and the students were asked to locate the numbers of the internal organs on the outline of the human body. The data was analyzed by descriptive analysis method. The study results revealed that the internal organs in the human body signed the most correctly were esophagus, trachea, lungs on the outline of the human body for the written and written-visual questions, while the internal organs in the human body signed the least correctly were spleen, pancreas, intestines for both of the questions. The students' total correct answers were mostly at the category of partly right to both written and written-visual questions. However, most of the students tended to sign much more internal organs in the human body in the written-visual question correctly than those of the written question.

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1. Introduction

Human body is composed of systems of organ occurred with combination of these organs and more organs. Tissues taking places at the human body are combined with specialization and they fulfill specified charges. These are called as organ. Organs in the human body can be classified in terms of their functions and locations in systems: Internal organs, digestive organs, reproductive organs, evacuation organs, respiration organs, circulation organs and sense organs. Internal organs in human body take place in the ribcage and abdominal region. Our internal organs involve trachea, esophagus, lungs, heart, stomach, liver, gallbladder, duodenum, pancreas, intestine, large intestine, rectum, spleen, kidneys, and appendicitis (İç organlarımız ve görevleri nelerdir?; Organlarımız: Vücudumuzdaki organlar ve görevleri).

The following subjects are taught to students by basing that our body works as a whole in 'Let's do our body puzzle' unit in the fourth grade Science and Technology course: Muscle and skeleton, breathing, heart, and blood. Before these subjects were taught in detail, their locations and functions had been

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taught. In breathing subject, nose, pharynx, larynx, trachea, and lungs haven been given. In the fifth grade Science and Technology course involves also 'Let's do our body puzzle' unit. Above mentioned subjects that students learned during the fourth grade Science and Technology course are connected with the concepts of digestive and evacuation without using the concept of system, the fact that students continue to recognize their own bodies especially the concepts of nutrition, digestive and evacuation that are suitable for daily life were aimed to be taught. Subjects in the 4th and 5th grade 'Let's do our body puzzle' unit are preparation for systems in our body subject that will be given in the secondary school (Fen ve Teknoloji dersi (4-5. sınıflar) öğretim programı).

Demirci Güler (2008) has asked the views of primary school prospective teachers about what was the most important subject which fourth grades students should learn in Science and Technology course. In his study, it has been determined that prospective teachers should learn biology mostly, later chemistry and physics subjects. It has been implied that the students have concentrated on 'Let's do our body puzzle' unit mostly in biology discipline. While the students mentioned the subjects of respiration, blood circulation and let's do exercise in this unit, they have never mentioned about the subjects of reinforcement and movement.

Alternative techniques like questionnaire, interview and drawing to determine students' thinking and understanding about any subject (Şenel Çoruhlu, Er Nas, & Çepni, 2008; Bahar, Özel, Prokop, & Uşak, 2008).

In the literature there were a lot of studies conducted with drawing, drawing and writing technique (Prokop, & Fancovicova, 2006; Demirci Güler, 2008; Gültepe, Yıldırım, & Sinan, 2008; Ormancı, & Sasmaz Ören, 2011; Çeken, 2011). There were also some studies about displaying places of internal organs in the human body (Bartoszeck, Machado, & Amann-Gainotti, 2008). For example, Prokop and Fancovicova (2006) demonstrated that there were no relationship between the level of understanding according to the university students' written responses about the function of bodily organs/organ systems and their ideas about the human body according to their drawings. The study results showed that although the students' understanding of functions of organs/organ systems was usually lacking, especially in digestive, respiratory and endocrine systems according to written responses, the students' drawings about organs or organ systems were well located in general.

Ormancı and Sasmaz Ören (2011) examined that the drawings of pre-service science and technology teachers about the digestive system. The study results showed that there was no significantly difference between the scores of the students' drawings about the digestive system according to gender, while there was a significant difference in terms of grade level in favor of the fourth-grade prospective teachers. There was no significant difference between the total scores of the students' drawings about digestive system with regard to their achievement status, while there was a significant difference with regard to their levels of knowledge about the digestive system. Additionally, the students had sufficient performance about the digestive system.

Gültepe, Yıldırım and Sinan (2008) wanted students to show respiration organs' and concepts' name on the figures in their experimental studies about respiration. Study conclusions reported that students knew larynx, muscle between ribbing bronchitis and air sacs and they knew trachea, lungs, heart and diaphragm partly. It was determined students knew main organs in the respiration system before learning subject. Moreover, it was determined the fact that trachea and lungs were cut and investigated by students could play in increasing success.

Çeken (2011) investigated figures about heart and lungs at the Science and Technology textbooks that are between 4th and 8th grade levels in his study. Bartoszeck, Machado and Amann-Gainotti (2008) highlighted that most of the students were located organs and organ systems inside human body appropriately. Few students drew all complete organ systems, particularly digestive and respiratory systems that were predominantly represented by lung, trachea, intestines and stomach. Heart was the most drawn organ but, not in detail.

As mentioned above, although there were many studies with drawing technique about internal organs in related literature, it has not been observed any studies about the location of the internal organs in the human body in Turkey. Therefore, this study has been carried out to determine the location of internal organs in human body by the fifth grade students.

2. Method

2.1. Aim

The aim of the study was to determine to what extent fifth grade students located the internal organs on the outline of human body.

2.2. Study group

Study group consisted of 150 students at two primary schools in Balıkesir in northwest of Turkey during the fall term of 2011-2012 academic years.

2.3. Data collection and data analysis

Data were collected by Locate Internal Organs Questionnaire consisting of two open-ended questions. In the first question (written question), the names with numbers of the internal organs in the human body were given to the students and the students were asked to locate the numbers of the internal organs on the outline of the human body. In the second question (written-visual question), the names and images with numbers of the internal organs in the human body were given to the students and the students were asked to locate the numbers of the internal organs on the outline of the human body.

Data were analyzed by descriptive analysis method. Thus, initially the answer sheets of the students were numbered from 1 to 150. Then, the students' responses to both written and written-visual questions were analyzed separately. In order to analyze the students' responses to these questions, the names and numbers of the internal organs in the human body given in the questionnaire were located on the outline of the human body by the authors of the study (See Figure 1). Figure 2 was useful, while the names and numbers were located on the outline of human body. Figure 2 displays the names and numbers of location of internal organs on a human body model. Data were analyzed based on this enumerating at Figure 1.

Analyses of the students' answers were done by comparing the numbers located by the students for the question with the numbers located at Figure 1. If the student located any number on the outline of the human body correctly, value 1 was given. Otherwise, value was 0. These processes were performed for written and written-visual questions separately. The frequency of each internal organ in the human body was calculated separately for two types of questions. The findings about these were given in Table 1.

In addition, knowledge levels of the students' total correct answers (total numbers located by the students correctly) on the outline of the human body to written and written-visual questions were categorized under completely wrong, partly right and completely right. The frequencies of the students' total correct answers for each question were calculated and the findings were given in Table 2.

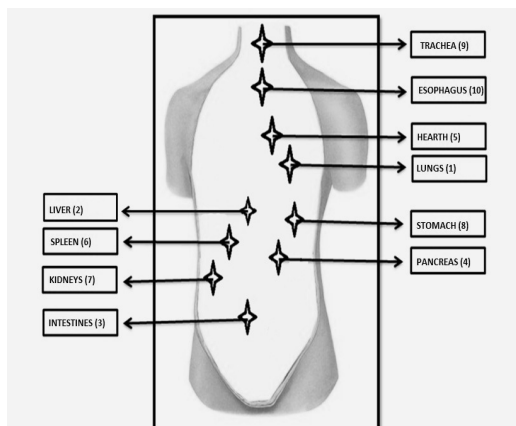


Figure 1. Names and location of numbers of internal organs on outline of human body

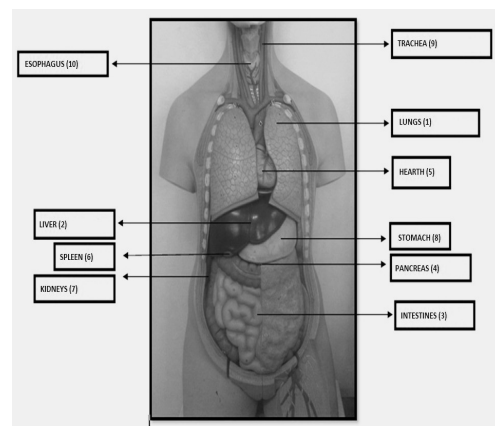


Figure 2. Names and location of numbers of internal organs on human body model

3. Results and discussion

The findings of the analyses of the students' responses to Question 1 and Question 2 were given in Table 1.

Table 1. The frequencies of the students' correct answers for each internal organ on the outline of the human body for written and written-visual questions

Question	Lungs (f)	Intestines (f)	Liver (f)	Pancreas (f)	Stomach (f)	Kidneys (f)	Heart(f)	Spleen (f)	Trachea (f)	Esophagus (f)
Q1. Written Question (Names of the Internal Organs)	<u>128</u>	71	98	32	90	100	114	35	<u>133</u>	<u>140</u>
Q2. Written-visual Question (Images of the Internal Organs with their Names)	<u>139</u>	59	102	50	84	101	128	43	<u>142</u>	<u>137</u>

As seen in Table 1, when Question 1 including the names of the internal organs in human body was asked to the students, esophagus (140), trachea (133) and lungs (128) were the most correctly signed internal organs on the outline of the human body. Similarly, when Question 2 including the names and images of the internal organs in human body was asked to the students, trachea (142), lungs (139) and esophagus (137) were the most correctly signed internal organs on the outline of the human body.

When Question 1 was given to the students, it was seen that internal organs that were signed the least correctly were pancreas (32), spleen (35) and intestines (71) on the outline of the human body. Similarly, in the when Question 2, it was seen that organs signed the least correctly were spleen (43), pancreas (50) and intestines (59) on the outline of the human body.

When the students' right responses of both written and written-visual questions were compared, these results were obtained: Although when the right responses of the students for both written and written-visual were compared, an increase was observed sometimes (for example, lungs, 128-139 students), it was seen that the rates of the students' right responses for the questions showed sometimes a decrease (for example, intestines, 71-59 students).

In a conclusion, the study results revealed that the internal organs in the human body signed by the students the most correctly were esophagus, trachea, lungs for both written and written-visual questions, while the internal organs in the human body signed the least correctly were spleen, pancreas, intestines for both of the questions. However, most of the students tended to sign much more internal organs in the human body in the written-visual question correctly than those of written question.

Ormancı and Sasmaz Ören (2011) reported that the students showed that a sufficient performance about the digestive system according to their drawings of digestive system. Additionally, Prokop and Fancovicova (2006) reported that although the students' understanding of the functions of organs/organ systems were usually lacking, especially digestive, respiratory and endocrine systems with regard to written responses, the students located well organs or organ systems in general with regard to students' drawings.

Moreover, the findings of knowledge levels of the students' total correct answers (total numbers located by the students correctly) on the outline of the human body to written and written-visual questions were given in Table 2.

Table 2. Students' knowledge levels of number localization of the internal organs in the human body for written and written-visual questions

Category	Total Correct Answer (f)	Written Question (f)	Written-visual Question (f)
Completely Wrong	0	1	0
	1	1	1
	2	2	6
	3	10	6
	4	20	10
Partly Right	5	26	20
	6	20	27
	7	24	31
	8	19	20
	9	14	15
Completely Right	10	13	14

According to Table 2, although the rate of the students' completely wrong answers at the written question was 1, this rate was 0 at the visual-written question. That was, only one person did not locate any internal organ on the outline of the human body correctly for the written question. On the other hand, the rates of the students' completely right answers to written and written-visual questions were not very high (13, 14). In short, while only 13 students located all internal organs on the outline of the human body correctly for the written question, only 14 students located all internal organs on the outline of the human body correctly for the written-visual question. The students' total correct answers were mostly at the category of partly right to both written and written-visual questions. However, it was observed that the rates of total correct answers at the written-visual question much more than that of written question in general. For example, the rate was 26 at the written question and 31 at the written-visual question.

When 'Let's do our body puzzle' unit which are in the Ministry of Education 4th and 5th grade Science and Technology teaching program were examined (Fen ve Teknoloji dersi (4-5. sınıflar) öğretim programı), it has been determined that internal organs at this unit has not given in systematically. Concepts of internal organs have been taught in some subjects such as breathing, digestion, nutrition, evacuation. Moreover, it is very important that internal organs in human body should be learned very well at the 4th and 5th grade because internal organs subject that will be given in the 'Systems at our body' subject at secondary school.

According to the current study findings, it can be suggested that the concepts of the internal organs in the human body should be given in a system in 'Let's do our body puzzle' unit at the 5th grade Science and Technology teaching program. Additionally, the subject of location of the internal organs in the human body can be given on a picture of a human body model at the 4th and 5th Science and Technology textbooks suggested by the Ministry of Education even if it is an assumption that there is a human body model in almost all primary schools.

On the other hand, in another study (Çeken, 2011) related to the figures of internal organs in the 4th and 5th grade Science and Technology textbooks, it was determined that there were some errors about the figures of lungs and heart in these textbooks. Hence, more further studies should be carried out on figures of internal organs in human body that are in the 4th and 5th grade Science and Technology textbooks. If these textbooks include misinformation about functions, figures and structures about internal organs in human body, they may affect students' future learning experiences negatively.

In order to teach the location of the internal organs in human body correctly, various teaching methods like using model, drama can be used. For instance, Ünüvar (2007) reported that the experimental group had creative drama was more successful than the control group with regard to students' achievement of 'Travelling into inner building of living thing' in science course. However, Ormancı and Özcan (2012) studied the effect of usage the drama method on the students' success in 'The systems in our bodies' unit in Science and Technology course. There was an experimental study in sixth grade. The study results showed that there was no significant difference between the students' achievement in the experimental group and the control group. Therefore, there is a need for more studies related to teaching the internal organs in the human body correctly.

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